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(72) Inventors:
• **Fitzpatrick, Terence Gerard**
Clough, Downpatrick BT30 8SJ (GB)
• **Fitzpatrick, Richard**
Clough, Downpatrick BT30 8SJ (GB)

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(74) Representative: **Earnshaw, Geoffrey Mark et al**
Murgitroyd & Company,
373 Scotland Street
Glasgow G5 8QA (GB)

(71) Applicants:
• **Fitzpatrick, Terence Gerard**
Clough, Downpatrick BT30 8SJ (GB)
• **Fitzpatrick, Richard**
Clough, Downpatrick BT30 8SJ (GB)

(54) Rapid hose delivery apparatus

(57) A rapid hose delivery apparatus comprising an all-terrain vehicle and a hose deployment means is described. The all-terrain vehicle generally has four or more wheel drive, and preferably a low ground pressure. One such vehicle is a quad motorbike.

The apparatus is able to deploy 'in one go' hundreds if not 1000 or more meters of hose over any terrain. Such apparatus could be used for deployment of fire hose for supplying water across inaccessible terrain.

The apparatus may further include hose retrieval means for retrieving the hose after use.

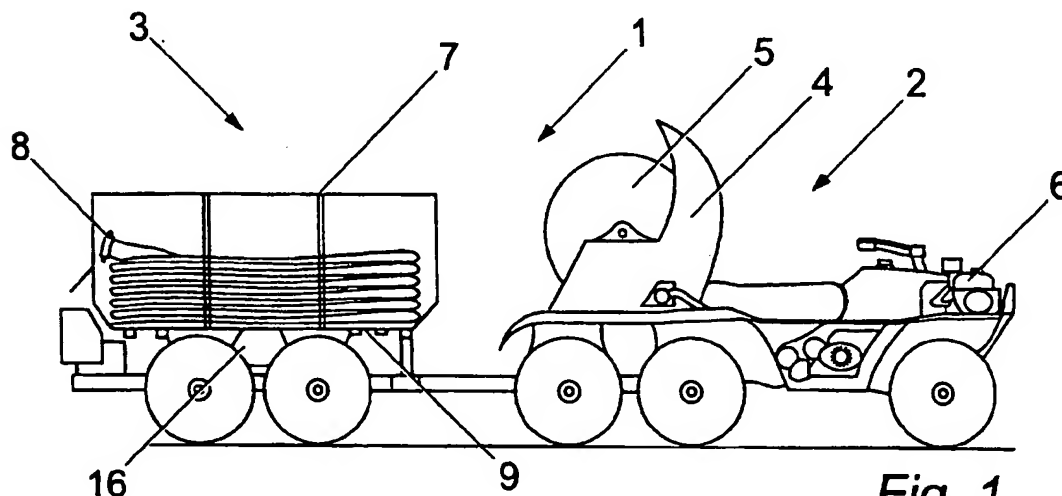


Fig. 1

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Description

[0001] The present invention relates to a rapid hose delivery apparatus, for example fire hose, particularly but not exclusively for use in off-road situations.

[0002] If a fire occurs in an outlying rural area, it creates logistical problems for the fire service who tackle the blaze. Fire engines often have difficulty accessing rural areas as their general size and weight prevent them from being used off the road in muddy terrain. In addition, it is often the case in rural areas that fire hydrants are not available, and water therefore must be drawn from bodies of water such as streams, rivers, or the like, which may be some distance from the fire across difficult terrain.

[0003] Other off-road situations where water is rapidly desired include airports, such as beyond runways, where the ground may not be hard enough to support existing emergency vehicles such as fire tenders.

[0004] Various solutions have been introduced to answer the problem of tackling fires in remote areas. Known solutions include the use of smaller fire engines which are essentially four-wheel drive vehicles adapted to carry reels of hose in the same way as a conventional fire engine. Another solution has been to use helicopters carrying the hose reels. However, with both these methods, only small bore hoses can be carried due to space and weight restrictions, and invariably these hoses are relatively short which means that the fire must be in close proximity to the body of water from which the water is to be drawn for these methods to be successful.

[0005] It is an object of the present invention to provide a means for rapidly deploying a relatively large bore hose over any, including relatively inaccessible, terrain to an otherwise inaccessible fire. Hosing for any other fluids such as fuel could be similarly provided.

[0006] Thus, according to one aspect of the present invention, there is provided a rapid hose delivery apparatus comprising an all-terrain vehicle and a hose deployment means.

[0007] The all-terrain vehicle includes any vehicle known or adapted to be driveable over usually inaccessible terrain, but usually also travelable upon hard surfaces such as roads. Such vehicles generally have four or more wheel drive, and may also have low ground pressure provided by a wide-tyre footprint. Such vehicles include "quad" motorbikes and the like, as well as larger four-wheel vehicles having greater load carrying ability. The term "all-terrain vehicle" is well known in the art.

[0008] The hose deployment means may be of any suitable size, shape or design able to contain a length or lengths of hose. Preferably, said hose is positioned in such means in folded layers. Multiple lengths of hose may be conjoinable using any known means.

[0009] In one embodiment of the present invention, the hose deployment means is integral with the all-terrain vehicle.

[0010] In an alternative embodiment of the present invention, the hose deployment means is separable from the vehicle, and may also be suitable means for storage of hose when the hose is not required.

[0011] According to a further embodiment of the present invention, the apparatus includes a hose retrieval means. The hose retrieval means may be separable or integral with the apparatus. Preferably, the hose retrieval means comprises a reel mechanism, which may be directly powered by the all-terrain vehicle, or separately powered e.g. hydraulically powered by a hydraulic power pack.

[0012] The hose retrieval means may also be movable between operable and non-operable positions when conjoined with the vehicle.

[0013] In a further embodiment of the present invention, the apparatus includes one or more trailers, upon which the hose deployment means and/or hose retrieval means may be mounted. The hose retrieval means may be mounted upon one trailer, and the or an hose deployment means can be mounted upon another trailer. The all-terrain vehicle may be adapted to transport said hose retrieval means and said hose deployment means either simultaneously or sequentially to a position of use.

[0014] The present invention provides a means to deploy hundreds if not more than 1000m of large bore hose rapidly, and over any terrain. Naturally, where 1000m or more of hosing is required rapidly, a larger all terrain vehicles would be required. Such a long length of hose may however be separable to assist deployment and/or recollection by the hose retrieval means.

[0015] The present invention is suitable for providing any form of hosing for any suitable fluid. Hosing for water is usable for fighting fires and other considerations. Hosing for e.g. fuel such as petrol or diesel may also be provided by the present invention where it is not desired or possible to neighbour the fuel supply means, e.g. a fuel bowser, and a fuel receiving means, e.g. a tank. Similarly, the hosing could be used to provide rapid means for diverting unwanted fluid from one position to another, such as spillage of hazardous fluids, especially in built-up areas or on roads.

[0016] Whilst the apparatus of the present inventions is 'self transporting', it could also be transported to a suitable location for use by other transport means.

[0017] Thus, according to a second aspect of the present invention, there is provided means to transport apparatus as defined herein comprising an apparatus holding means such as a road trailer or liftable frame for e.g. lifting by a helicopter. Thus, the apparatus could be rapidly delivered to an 'off road' situation from a suitable storage base, for immediate use and deployment.

[0018] According to a third aspect of the present invention, there is provided a method for deploying a length of hose using apparatus as hereinbefore described comprising the steps of:

securing a first end of the hose to a fluid supply

point;
driving the all-terrain vehicle with hose deployment means to a separate location, whilst deploying the hose from the deployment means.

[0019] Preferably, the method includes retrieval of the hose using the same all-terrain vehicles with a hose retrieval means located therewith.

[0020] Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a side view of a first embodiment of a fire hose apparatus according to the present invention; and

Figures 2 and 3 are side views of a second embodiment of a fire hose apparatus according to the present invention;

Figure 4 is a side view of a third embodiment of the present invention; and

Figure 5 is a perspective view of another embodiment of the present invention.

[0021] Looking at Figure 1, a fire hose apparatus is generally designated 1. The apparatus 1 consists primarily of an all-terrain vehicle 2 such as a "quad" motorbike or the like, and a trailer 3 attached to the vehicle 2. The vehicle 2 has a reel mechanism 4 attached at the rear of the vehicle behind the driver. This mechanism 4 has a hose reel 5 which is operated hydraulically and is powered by a pump 6 which is attached at the front of the vehicle 2 to aid weight distribution.

[0022] The trailer 3 has a flat bed 9 which is designed so as to be capable of having a variety of interchangeable appliances attached to it. In the first embodiment as seen in Figure 1, a removable basket 7 is attached to the trailer 3. Within the basket 7 is stored a large bore (preferably 12cm or more) fire hose 8 which is approximately 300m in length, and which is layered (also known as "flaked") in the basket 7 to aid deployment.

[0023] In order to deploy the hose 8 from the basket 7, the end of the hose 8 is secured to a portable pump at the source of water from which the water is to be pumped to fight a fire. Then the vehicle 2 is driven towards the fire site towing the trailer 3 and basket 7 behind. As the vehicle 2 and trailer 3 are driven from the source of water, the hose 8 deploys behind the apparatus 1. A number of the baskets 7 can be carried to the fire site for deployment by the apparatus 1, or be situated at convenient locations for rapid retrieval and use. Therefore, it is possible to deploy a number of the hoses 8 and connect them together to produce a hose 8 which can be up to 1km in length, in the case of 5 inch ($\alpha 130\text{mm}$) hose, or 2 to 3km if 3 inch ($\alpha 76\text{mm}$) hose is used.

[0024] Once the fire has been contained and extinguished, the hose 8 must be retrieved. In order to do this, the end of the hose 8 is attached to the hose reel

5 and, under the action of the pump 6, the hydraulic reel mechanism 4 winds the reel 5, thus retrieving the hose 8. Although the reel mechanism 4 is used to retrieve the hose 8, it is not used to deploy the hose 8, for the reason that if the vehicle 2 were moving across rough terrain, the bouncing of the vehicle 2 would upset the reel mechanism 4. In particular, if the vehicle 2 were to stop suddenly while deploying the hose 8 from the reel 5, the inertia of the reel may cause the hose 8 to become entangled, thereby delaying the deployment of the hose 8 and possibly damaging the hose.

[0025] Once the hose 8 has been fully retrieved onto the reel 5, the vehicle 2 and trailer 3 can travel away from the site. When the hose apparatus 1 has been returned to its base location, the hose 8 can then be transferred back to the basket 7 from the reel 5. When the hose 8 is stored within the basket, it is preferably laid in layers. The layering of the hose 8 not only aids deployment, but also allows air to circulate, whereas storing the hose 8 on a reel 5 will lead to the deterioration of the hose 8 over time, as a result of air not being permitted to circulate properly.

[0026] A second embodiment of the present invention is shown in Figures 2 and 3. In Figure 3, the reel mechanism 4 is attached to the or a trailer 3 rather than the vehicle 2, leaving the vehicle 2 free of any apparatus. In Figure 2, it is possible that the basket 7 may be attached to the vehicle 2, thus only requiring the trailer 3 with reel mechanism 4 to be attached when the hose 8 is to be retrieved following a fire. Clearly any combination is possible.

[0027] In order to transport the apparatus 1 to and from a base location to a fire site, a road trailer as shown in Figure 4 can be provided which is simply towed behind a standard fire appliance or four wheel drive vehicle. The road trailer 10 is a split level trailer showing an all-terrain vehicle 2 and trailer 3 as shown in Figure 3 being located on the upper level 12, and the baskets 7 containing the stored hose 8 located on the lower level 14.

[0028] A simple ramp mechanism provided on the road trailer 10 permits the vehicle 2 and trailer 3 to be driven onto the upper level 12.

[0029] In Figure 1, the trailer bed 9 is shown rotatably mounted on a central post 16 such that it can be locked fore-and-aft (as shown) or sideways, at 90°. This mechanism assists use of the apparatus with the arrangement in Figure 4. The road trailer 10 preferably is arranged to carry three baskets 7 in a sideways orientation on rails whereby the baskets 7 can be slid onto and off the trailer bed 9. For this purpose, the off-road trailer 3 is driven alongside (on either side) of the road trailer 10, and the trailer bed 9 turned sideways. The off-road trailer 3 may be provided with a winch (e.g. an electric winch) to pull the baskets 7 from the road trailer 10.

[0030] The empty baskets 7 can be returned to the road trailer 10 after use, and the hoses 8 flaked into them from the reel 5.

[0031] Alternatively, the road trailer shown in Figure 4 could be the basis for a general frame (with or without wheels) for transport of the apparatus 1 by other means, e.g. helicopter, boat, etc.

[0032] Figure 5 shows a further embodiment of the present invention comprising a four-wheel drive truck 20 also having wide-tyres 22. Mounted on the truck 20 is a box 24 in which is layered a hose 26. Deployment of the hose 26 is similar to deployment of the hose using the apparatus 1 shown in Figures 1-3, but the size of the truck 20 allows 1000m of hose or more to be stored ready for deployment in the box 24. The hose 26 may be formed in separable sections, and if so, it is preferably pre-connected ready for deployment 'in one go'.

[0033] Also attached to the truck 20 is a hose retrieval means being a reel mechanism 28. This mechanism 28 has a reel 30 which can be powered by any suitable drive means from the truck 20. The reel mechanism 28 is movable between a non-operable position as shown in Figure 5, and an operable position when required to retrieve the hose 26. The non-operable position of the reel mechanism 28 allows rapid and easy deployment of the hose 26 from the box 24. When required to retrieve the hose 26, the reel mechanism 28 is raised. Retrieval of 1000m or more of hose may need the hose to be separated into sections so that each section is retrievable with ease.

Claims

1. A rapid hose delivery apparatus comprising an all-terrain vehicle and a hose deployment means.
2. Apparatus as claimed in Claim 1 wherein the vehicle has four or more wheel drive.
3. Apparatus as claimed in Claim 1 or Claim 2 wherein the vehicle has low ground pressure.
4. Apparatus as claimed in any one of the preceding Claims wherein the vehicle is a quad motorbike.
5. Apparatus as claimed in any one of Claims 1-3 wherein the vehicle is a truck.
6. Apparatus as claimed in any one of the preceding Claims wherein the hose deployment means contains a length or lengths of hose.
7. Apparatus as claimed in Claim 6 wherein the or each hose is positioned in the hose deployment means in folded layers.
8. Apparatus as claimed in Claim 6 or Claim 7 having a plurality of lengths of hose conjoined in the hose deployment means.
9. Apparatus as claimed in any one of the preceding Claims wherein the hose deployment means is integral with the all-terrain vehicle.
10. Apparatus as claimed in any one of Claims 1-8 wherein the hose deployment means is separable from the vehicle.
11. Apparatus as claimed in any one of the preceding Claims which includes a hose retrieval means.
12. Apparatus as claimed in Claim 11 wherein the hose retrieval means is separable from the vehicle.
13. Apparatus as claimed in Claim 11 wherein the hose retrieval means is integral with the vehicle.
14. Apparatus as claimed in any one of Claims 11-13 wherein the hose retrieval means comprises a reel mechanism.
15. Apparatus as claimed in Claim 14 wherein the reel mechanism is powered by the vehicle.
16. Apparatus as claimed in any one of Claims 11-15 wherein the hose retrieval means is moveable between operable and non-operable positions when conjoined with the vehicle.
17. Apparatus as claimed in any one of the preceding Claims wherein the hose deployment means and/or hose retrieval means is mounted on one or more trailers.
18. Apparatus as claimed in Claim 17 wherein the hose deployment means is mounted on one trailer, and the hose retrieval means is mounted on another trailer.
19. Apparatus as claimed in any one of Claims 11-18 wherein the vehicle is adapted to transport the hose retrieval means and hose deployment means either simultaneously or sequentially to a position of use.
20. Apparatus as claimed in any one of the preceding Claims for deployment of a length of hose of 1000m or more.
21. Apparatus as claimed in any one of the preceding claims for deployment of water hosing.
22. Apparatus as claimed in Claim 21 wherein the hosing is firehose.
23. Apparatus as claimed in any one of Claims 1-20 for deployment of fuel hosing.
24. Transport means adapted to transport apparatus as

claimed in any one of Claims 1-23 comprising apparatus holding means adapted to secure the apparatus to a frame for transport by an air, land or sea vehicle.

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25. Transport means as claimed in Claim 24 being a road trailer.

26. Transport means as claimed in Claim 25 for lifting by a helicopter.

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27. A method for deploying a length of hose using apparatus as claimed in any one of Claims 1-23 comprising the steps of;

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securing a first end of the hose to a fluid supply point;
driving the all-terrain vehicle with the hose deployment means to a separate location whilst
deploying said hose from the deployment means.

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28. A method as claimed in Claim 27 which further includes the step of retrieval of a hose using a hose retrieval means located with the all-terrain vehicle.

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29. A method as claimed in Claim 28 wherein the hose is retrieved in sections.

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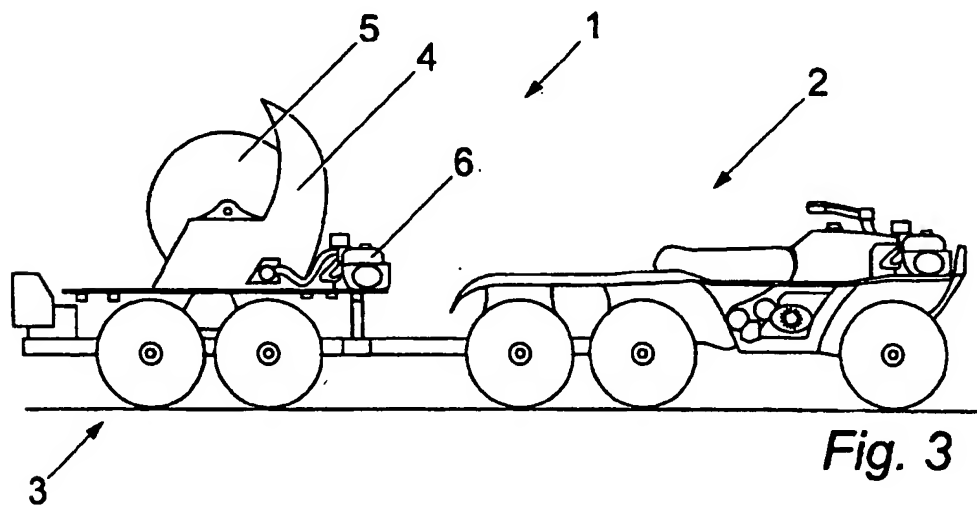
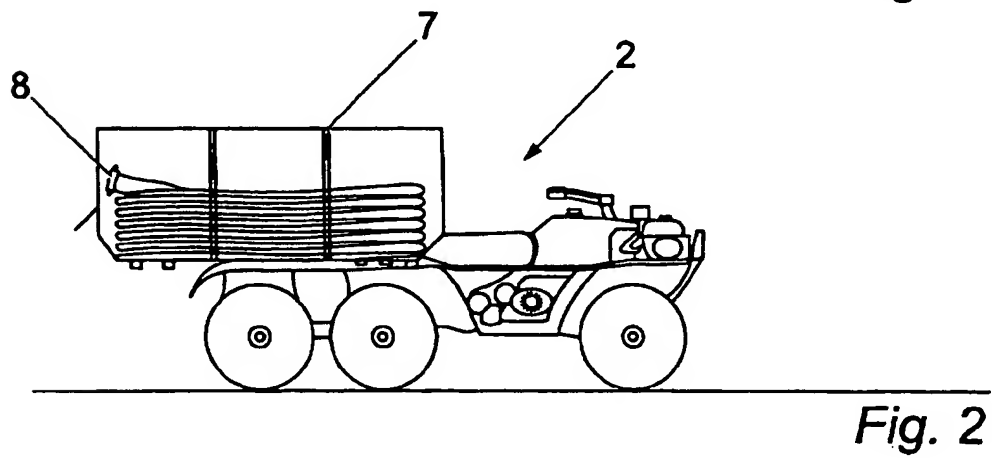
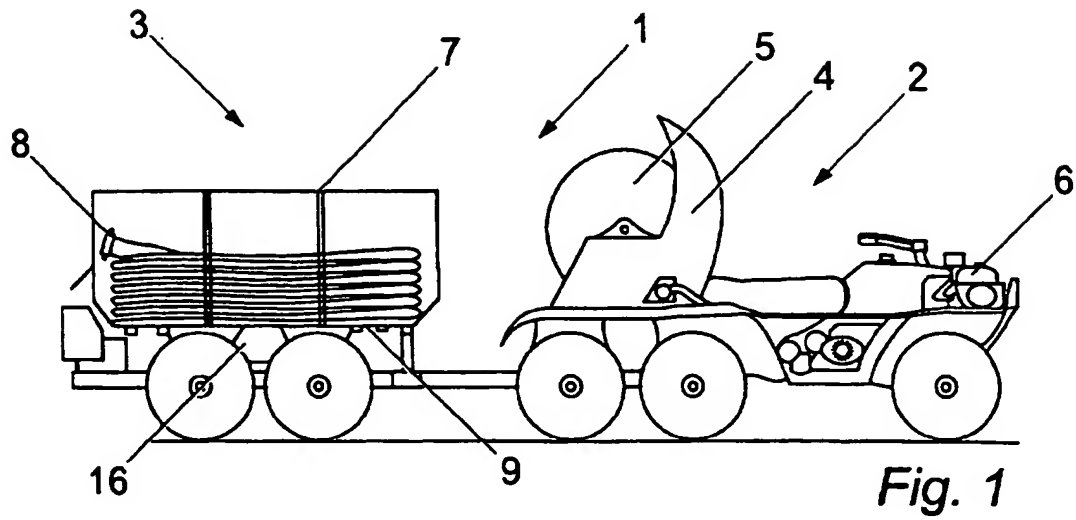
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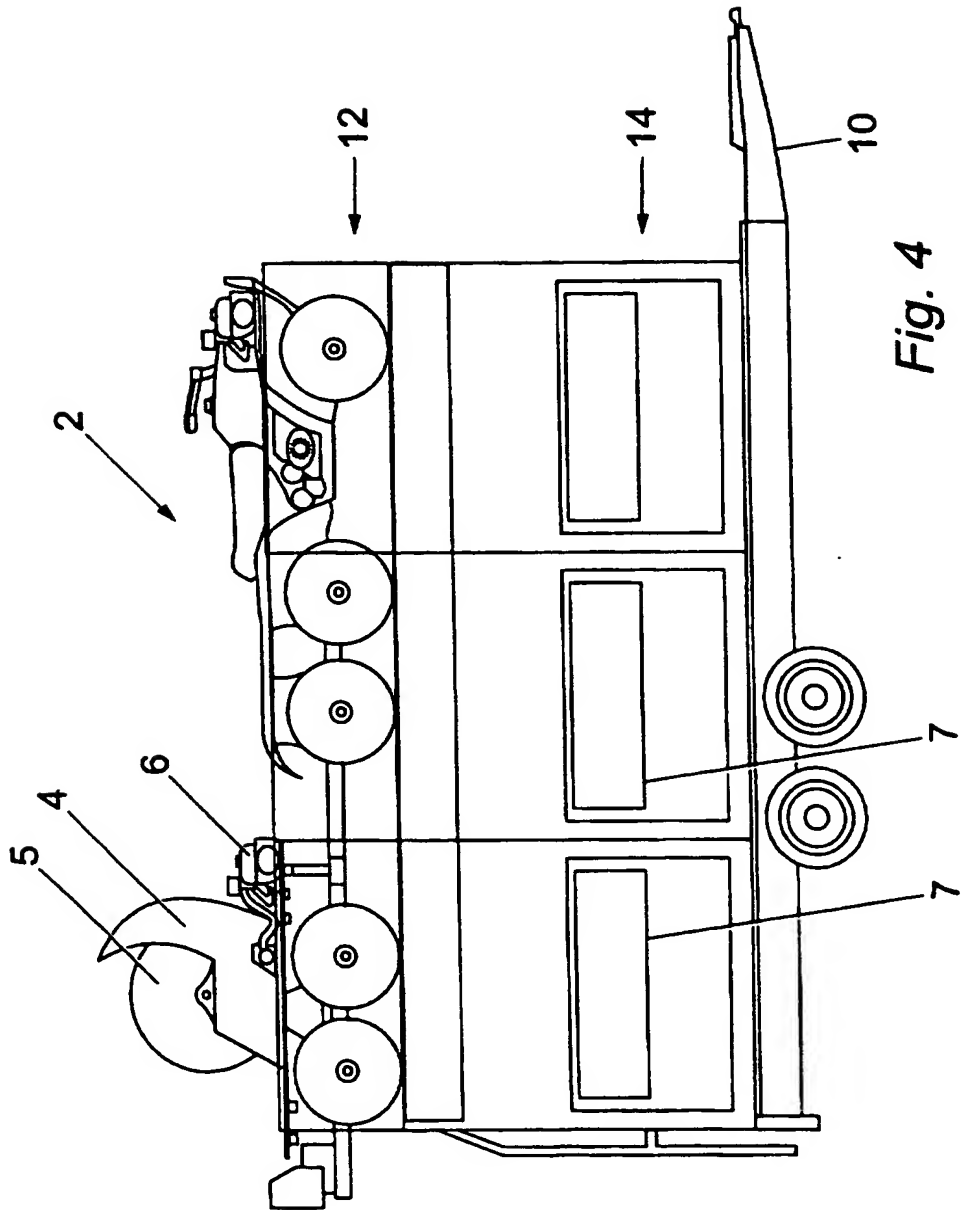


Fig. 4

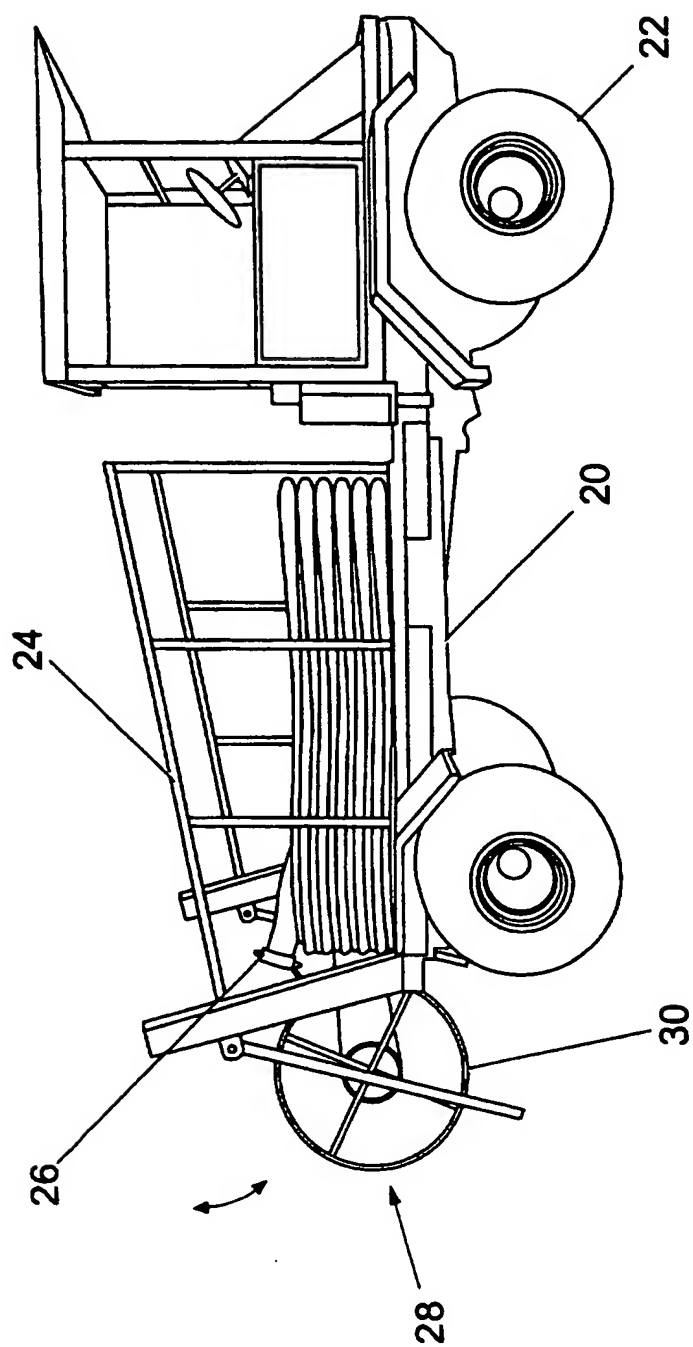


Fig. 5